Effect of Heparin on Incidence of Posterior Capsular Opacification Aftercataract Surgery in Children

Yasir Iqbal, Sohail Zia, Aneeq Mirza

ABSTRACT

AIM: To find out the effect of heparin on the incidence of posterior capsular opacification after cataract surgery in children.
STUDY DESIGN: Quasi Experimental Design.
PLACE AND DURATION OF STUDY: REDO Eye Hospital, Rawalpindi from Jan 2008 to Jan 2011.
MATERIALS AND METHODS: Twenty eyes of fifteen patients aging 4 to 10 years with uncomplicated pediatric cataracts were selected in the study. The children were operated for cataract under general anesthesia and the anterior chamber was irrigated with heparin sodium (5 IU/cc) while added to balanced salt solution (BSS Plus). All patients received standardized postoperative treatment. All patients were followed on the first post operative day, after one week, after one month and were advised follow up at the 3rd, 6th months and one year postoperatively for the incidence of PCO.
RESULTS: No fibrinous reaction or membrane or synechias formation on the pupil was observed. Posterior capsular opacification(PCO) was observed in 10 % cases after 6 months and in 15% cases after one year.
CONCLUSION: After irrigating the anterior chamber with Heparin sodium in cataract surgery of children the incidence of PCOwas 15% on one year follow up.

KEY WORDS: Heparin, cataract, posterior capsular opacification.

INTRODUCTION

Pediatric cataract surgery is always a challenge to the ophthalmologist because the children eyes manifest more post operative inflammation as compared to adults.[1] After performing cataract surgeries in children the frequent complication is opacification of the posterior capsule. The incidence of posterior opacification (PCO) has been reported from 40%[2] to almost 51.72%[3] by many researchers after pediatric cataract surgery. PCO is treated with Nd: YAG laser but in children there are difficulties of getting co-operation from the patient, also access to the laser is not widely available[4] and the treatment itself represents a cost burden to the free health care system[5].

Heparin, an anti coagulant, has been used in the form of heparin coated IOLs since many years and has effectively reduced postoperative inflammation and PCO formation. A study conducted by Yelda Özkurt et al[6] showed incidence of PCO in 7% of cases after adding heparin in the irrigating solution. We conducted a similar study to determine the effect of heparin in the incidence of PCO in our population after adding it to the irrigating solution.

MATERIALS AND METHODS

It was a prospective non-randomized Quasi Experimental study conducted in Redo Eye Hospital, Rawalpindi during the period of January 2008 to July 2011. Twenty eyes of fifteen patients aging 4 to 10 years with uncomplicated pediatric cataracts were selected for the study. They were allotted hospital number and were prepared for general anesthesia with all the systemic review and investigations. The parents signed an informed consent for the procedure. Children were operated by one experienced surgeon under general anesthesia. 1 ml of heparin sodium (concentration 10 IU/ml) added to the irrigating balanced salt solution to irrigate the anterior chamber during the surgery.Procedure was started with a conjunctival flap made at superotemporal part of the limbus. The construction of the scleral tunnel was done using a crescent knife which was extended to 1.0 mm into clear cornea. A 3.2mm keratome was used to access the anterior chamber and the internal corneal incision was extended for about 0.5mm more than the external scleral incision. Deepening of the anterior chamber was done using a viscoelastic substance and continuous curvili near capsulorrehexis of 5 - 6 mm was done using a bent 27-gauge needle mounted on the irrigating infusion. The nucleus was aspirated and the cortex was washed using a simcoe cannula. A PMMA PCIOL was implanted in the capsular bag inflated by viscoe-

lastic. The viscoelastic material was removed by BSS solution containing heparin sodium (5 IU/cc). The integrity of the self-sealing scleral incision was ensured and the cut conjunctival flap was apposed using a forceps fitted to bipolar diathermopy. Subconjunctival injection containing gentacin and dexamethasone were given in the end. A standard postoperative treatment was designed; comprising of prednisolone acetate 1% one hourly for one week followed by five times a day for the second week and tapered over six weeks and moxifloxacin four times a day for one month. No oral steroids or topical mydriatic treatment was to be given.The treatment was to be modified in case of intra operative complications and severe inflammatory response and the case was to be excluded from the study.

Follow up examinations were done on the first post operative day, after one week and after one month. After one month of the surgery the patients were advised follow up on the 3rd, 6th month and 1st post operative year for evaluation of PCO.

Statistical Analysis:

The data was analyzed in statistical program SPSS version 16.0. Descriptive statistics were calculated for all categorical variables. Mean and standard deviation was calculated for the quantitative variables that is age in years etc.

RESULTS

Twenty eyes of fifteen patients aging 4 to 10 years (mean 6 ±0.05) years were included in the study and 40 % of the study group belonged to 4-6 years age group. The study population consisted of 46.67% males and 53.33% females (**Table I)**.10 patients were operated unilaterally whereas 5 were operated for the both eyes after an interval of one month (**Table II)**.

On the first operative day,mild anterior reaction was seen in 10 cases (50%) and moderate anterior chamber reaction was observed in 15% of patients which disappeared on the 7th post operative day with the standard treatment.Hyphema or intraocular hemorrhage was not seen in any of the cases. The patients were followed up for routine post operative examination and none were found to have any significant complication.

On the 3rd post operative month there was no PCO in any case but after 6 months PCO was seen in 10 % of the cases and in 15% after a follow up of one year **Table III.**

TABLE I: DEMOGRAPHIC DETAILS (n = 15)

	Number	Percentage
Age (in groups)		
4-6	06	40%
7-8	05	35%
8-10	04	25%
Gender:		
Male	07	46.67%
Female	08	53.33%

TABLE II: OPERATED EYES LATERALITY DISTRIBUTION (n = 20)

Operated patients (n=15)	Males n=7	Females n=8	Total
Unilateral	4	6	10
Bilateral	3	2	5

TABLE III: PCO IN THE FOLLOW UP PERIOD

Follow up period	PCO
3rd month	Nil
6th month	2(10%)
One year	3(15%)

DISCUSSION

Posterior capsular opacification (PCO), a widely used name, is a misnomer. Multifactorial causes of PCO have been reported in several studies but it is not the posterior capsule which undergoes opacification. Actually it is an opaque membrane that develops as retained epithelial cells of the lens which proliferate and migrate onto the posterior capsular surface[7] .It is thought to be a universal vision reducing complication after pediatric cataract surgery[8] and the incidence of PCO after pediatric cataract surgery has been reported as high as 95.8%[9].

It requires subsequent disruption of the lens capsule either by laser or surgically. The development of the neodymiumyag laser (Nd:YAG) and the refinement of its technology have resulted in a reliable method for management of the PCO in adults.In applying the Nd: YAG laser there are difficulties in children, access to the laser is not widely available[4] and the treatment itself represents a cost burden to the free health care system.[5]

Researchers have been suggesting different methods to prevent PCO formation. Some of them advocate removing the posterior capsule during surgery to prevent PCO .Jensen et al[10]suggest that posterior capsulotomy should be done for all the children less than 6 years old undergoing cataract surgery with PC IOL

implantation. Similarly, Hong et al[11] observed that posterior capsulotomy is an effective option for preventing PCO after surgery in congenital cataracts. Others researchers have suggested other resorts while keeping the posterior capsule intact by modifications in the IOL design, material type of haptic, and surface. Some of them recommended sharp-edged[12] and round-edged IOLs [13].Others advocated the use of acrylic intraocular lenses instead of PMMA like Rowe[14], Nihalani[15]and Aasuri[16].As these measures increase the cost of the surgery therefore are less feasible in patients belonging to low socio economic group.

Heparin is an anticoagulant having anti-inflammatory and antiproliferative function. It inhibits fibrinous reactions after intraocular surgery by inhibiting fibroblasticactivity [17].Keeping this fact in view Bastiet al[18] and Koraszewska-Matuszewska et al[19] used heparin surface modified IOLs and reported delay in the incidence of PCO in children. Topical heparin eye drops were also useful in reducing fibrotic PCO in the long term by Mastropasqua[20].

We conducted a prospective study by adding heparin in irrigating solution. In our study we found that PCO occurred in 10% cases after 6 months and in 15% after one year. This is comparable to 7% cases developing PCO in study conducted Yelda B Özkurt et al[6]who also used heparin in the irrigating solution. Augmented suggestions for use of heparin in the irrigation fluid have also been made by some who say that with heparin coated IOL and primary posterior capsulorrehexis added with heparin irrigation prevents PCO[21]. This suggests that heparin in irrigating solution is a promising method and can be the solution to the problem of capsular opacification.

Hyphema was reported by Bayramlar et al[17]after using heparin sodium during pediatric secondary IOL implantation. Such incidence was not seen in any of our case. However, this can be reduced by using low molecular weight heparin.

We know that our study has short comings. The sample size was small, it was a non comparative study and the follow up time was only one year but the results are promising and may prove helpful in conducting a study with a larger sample size and a longer follow up period.

CONCLUSION

After irrigating the anterior chamber with Heparin sodium in cataract surgery of children the incidence of PCO was 15% on one year follow up.

REFERRENCS

1. Rumelt S, Stolovich C, Segal ZI, Rehany U. Intraoperative enoxaparin minimizes inflammatory reaction after pediatric cataract surgery. Am J Ophthalmol. 2006; 141:433–7.
2. PandleySK,WilsonME,TrivediRH,Izak A, MackyTA,WernerL,et al. Pediatric cataract surgery and intraocular lens implantation : current techniques, complications and management. IntOphthalmolClin 2001; 41:175-96.
3. Iqbal M, Jan S, Khan MN, Iqbal A, Mohammod S. Pediatrics intraocular lens implantation complications and visual outcome. Pak J Med Res Jul - Sep 2004; 43(3):108-12.
4. Apple DJ, Ram J, Foster A, Peng Q. Elimination of cataract blindness: A global perspective entering the new millennium. SurvOphthalmol. 2000 Nov;45Suppl 1:S1-196.
5. Apple DJ, Solomon KD, Tetz MR, Assia EI, Holland EY, Legler UF, et al. Posterior capsule opacification. SurvOphthalmol 1992; 37:73-116.
6. Özkurt YB, Taşkıran A, Erdogan N, Kandemir B, DoğanÖK .Effect of heparin in the intraocular irrigating solution on postoperative inflammation in the pediatric cataract surgery. ClinOphthalmol. 2009; 3: 363–5.
7. Janice LW, Iris MW, Liping Z, Sue MA. Activation of Src Kinases signals induction of posterior capsule opacification.*Invest. Ophthalmol. Vis. Sci.* 2007 vol. 48 no. 5 2214-23
8. Sharma N, Pushkar N, Dada T. Complications of pediatric cataract surgeryand intraocular lens implantation. J Cataract Refract Surg 1999; 25:1585-8.
9. Knight-Nanan D, O'Keefe M, Bowell R. Outcome and complications of intraocular lenses in children with cataract. J Cataract Refract Surg. 1996;22:730-6.
10. Jensen AA, Basti S, Greenwald MJ, Mets MB. When may the posterior capsule be preserved in pediatric intraocular lens surgery? Ophthalmology 2002;109(2):324-7.
11. Hong S, Seong GJ, Kim SS. Posterior Capsulectomy Using A 25 –Gauge Micro incision Vitrectomy System For Preventing Secondary Opacification After Congenital Cataract Surgery: Out Come Up to 4 Years. Can J Ophthalmol. 2009;44 (4):441-3.
12. Findl O. Buehl W., Bauer P., Sycha T. Interventions for preventing posterior capsule opacification. Cochrane Database Syst. 2010; 17 (2):CD003738.
13. Brar GS, Grewal DS, Ram J, Singla M, Grewal SP. Square-edge polymethylmethacrylate intraocular lens design for reducing posterior capsule opacification following paediatric cataract surgery: initial experience. Clin Experiment Ophthalmol. 2008 Oct; 36(7):625-30.
14. Rowe NA, Biswas S, Lloyd IC.Primary IOL implan-

tation in children: a risk analysis of foldable acrylic v PMMA lenses.Br J Ophthalmol. 2004 Apr; 88 (4):481-5.
15. Nihalani BR, VasavadaAR.Single-piece AcrySof intraocular lens implantation in children with congenital and developmental cataract.J Cataract Refract Surg.2006 Sep; 32(9):1527-34.
16. AasuriMK, Fernandes M, Pathan PP. Comparison of acrylic and polymethyl methacrylate lenses in a pediatric population. Indian J Ophthalmol. 2006;54 (2):105-9.
17. Bayramlar H, Totan Y, Borazan M. Heparin in the intraocular irrigating solution in pediatric cataract surgery. J Cataract Refract Surg. 2004; 30: 2163-9.
18. Basti S, Ausuri MK, Reddy MK, Preetam P, Reddy S ,Gupta S et al. J Cataract Refract Surg. 1999;25 (6):782-7.
19. Koraszewska-Matuszewska B, Samochowiec-Donocik E, Pieczara E, Flilipek E.Heparin-surface-modified PMMA intraocular lenses in children in early and late floow up. KlinOczna 2003;105 (5):273-6.
20. Mastropasqua L, Lobefalo L, Ciancaglini M, Ballone E, Gallenga PE. Heparin eye drops to prevent posterior capsule opacification. J Catarct Refract surg.1997; 23(3):440-6
21. Dada T. Intracameral heparin in pediatric cataract surgery. J Cataract Refract Surg. 2003;29 (6):1056.

AUTHOR AFFILIATION:

Dr. Yasir Iqbal *(Corresponding Author)*
Assistant Professor, Department of Ophthalmology
Islamic International Medical College-Trust
Pakistan Railway Hospital, Rawalpindi, Punjab-Pakistan.
Email: yazeriqbal@yahoo.com

Dr. Sohail Zia
Assistant Professor, Department of Ophthalmology
Islamic International Medical College-Trust
Pakistan Railway Hospital, Rawalpindi, Punjab-Pakistan.

Prof. Aneeq Mirza
Department of Ophthalmology
Islamic International Medical College-Trust
Pakistan Railway Hospital, Rawalpindi, Punjab-Pakistan.